

MERCURY EXPOSURE OF BREAST FED INFANTS IN A SMALL SCALE GOLD MINING AREA IN ZIMBABWE

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Background and Aims: In Kadoma (Zimbabwe) gold is extracted from ore based on a simple technology using mercury. Women are exposed whilst living in an exposed area, or even more working directly with mercury. Breast fed infants are burdened via contaminated milk and the general environmental exposure. The aim of the study was to prove the hypothesis that the uptake of mercury via breast milk is a relevant pathway of exposure.

Methods: In 2006, an environmental epidemiological field study with 120 mother –child pairs was conducted. A non exposed control group (n=42) was compared medium exposed group (n=51) and a high exposed group (occupational exposure, n=27). Urine and hair samples from mother and infants plus breast milk samples were analyzed for total mercury. 120 breast milk samples were analyzed. Chi-square (Pearson), ANOVA, T-test Kruskal Wallis, Mann-Whitney test, and Spearman's rank correlation coefficient test were used. The daily uptake of mercury via breast milk was calculated. The reference dose of $0.3 \mu\text{g}/\text{kg BW}/\text{d}$ was used to compare the burden of the infants.

Results: Breast milk median (maximum) concentrations [$\mu\text{g Hg}/\text{l}$] were (i) control group < 0.50 (1.55), (ii) medium exposed group 1.10 (10.48), (iii) high exposed group 1.20 (24.80) ($p < 0.001$). Urine and hair results are distributed similarly for infants and mothers. All specimen results correlated significantly with another, indicating that the exposure of the infant correlates with the burden of the mother and the breast milk. No infant from the control group, but 17.6% of the medium and 18.5% of the high exposed group were above the reference dose ($p < 0.001$).

Conclusions: Mercury in breast milk is generally elevated in small scale gold mining areas. Breast fed infants are burdened with toxic mercury via breast milk, which is an important public health issue.